

CLAIMS

What is claimed is:

- 1 1. A line card in a network element comprising:
- 2 a deframer unit to receive a Time Division Multiplexing (TDM) signal, the
- 3 TDM signal including a payload and overhead data, the deframer to generate frame
- 4 alignment data based on the overhead data;
- 5 a packet engine unit coupled to the deframer unit, the packet engine unit to
- 6 receive the payload, the overhead data and the frame alignment data and to generate a
- 7 number of packet engine packets, the packet engine packets representing a frame
- 8 within the TDM signal such that the packet engine packets include the payload and
- 9 the frame alignment data; and
- 10 a packet processor coupled to the deframer unit, the packet processor to
- 11 receive the packet engine packets and to generate network packets based on the
- 12 packet engine packets.
- 1 2. The line card of claim 1, wherein the packet engine packets include the
- 2 payload, the overhead data and the frame alignment data.
- 1 3. The line card of claim 1, wherein the TDM signal includes a Digital Signal
- 2 (DS)-1 signal.
- 1 4. The line card of claim 1, wherein the TDM signal includes a Digital Signal
- 2 (DS) – 3 signal.
- 1 5. The line card of claim 1, wherein the TDM signal includes an E1 signal.
- 1 6. The line card of claim 5, wherein the packet processor compresses the DS0
- 2 signals.

1 7. The line card of claim 1, wherein the packet processor separates Digital Signal
2 (DS) – 0 signals from within the TDM signal.

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1 8. A network element comprising:
2 a number of line cards, each of the number of line cards including:
3 a deframer unit to receive a Time Division Multiplexing (TDM) signal,
4 the TDM signal including a payload and overhead data, the deframer to generate
5 frame alignment data based on the overhead data;
6 a packet engine unit coupled to the deframer unit, the packet engine
7 unit to receive the payload, the overhead data and the frame alignment data and to
8 generate a number of packet engine packets, the packet engine packets representing a
9 frame within the TDM signal such that the packet engine packets includes the
10 payload, the overhead data and the frame alignment data; and
11 a packet processor coupled to the deframer unit, the packet processor
12 to receive the packet engine packets and to generate network packets based on the
13 packet engine packets; and
14 at least one control card coupled to the number of line cards.

1 9. The network element of claim 8, wherein the TDM signal includes a Digital
2 Signal (DS)-1 signal.

1 10. The network element of claim 8, wherein the TDM signal includes a Digital
2 Signal (DS) – 3 signal.

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1 11. The network element of claim 8, wherein the TDM signal includes a J1 signal.

1 12. The network element of claim 8, wherein the packet processor separates a
2 number of Digital Signal (DS) – 0 signals from within the TDM signal.

1 13. The network element of claim 12, wherein the packet processor for each of the
2 line cards forwards the number of DS0 signals out to any of the number of line cards
3 based on forwarding tables, wherein any of the number of DS0 signals from any of
4 the number of line cards can be combined to form a DS1 signal.

1 14. The network element of claim 13, wherein the DS1 signal is transmitted out
2 from the line cards.

1 15. The network element of claim 12, wherein the packet processor compresses
2 the DS0 signals.

1 16. A method comprising:
2 receiving a TDM signal that includes overhead data and payload data;
3 generating frame alignment data based on locations of frame boundaries
4 within the TDM signal;
5 placing the TDM signal into packet engine packets based on the frame
6 boundaries within the TDM signal, wherein the overhead data, the payload data and
7 the frame alignment data are within packet engine packets, such that each packet
8 engine packet corresponds to a frame within the TDM signal; and
9 encapsulating the packet engine packets into network packets.

1 17. The method of claim 16, wherein the TDM signal includes a Digital Signal
2 (DS) – 1 superframe signal, such that each packet engine packet includes a DS1 frame
3 of the DS1 superframe signal.

1 18. The method of claim 16, wherein the TDM signal includes a Digital Signal
2 (DS) – 1 extended superframe signal, such that each packet engine packet includes a
3 DS1 frame of the DS1 extended superframe signal.

1 19. The method of claim 16, wherein the TDM signal includes a Digital Signal
2 (DS) – 3 signal, such that each packet engine packet includes a subframe of the DS3
3 signal.

1 20. The method of claim 16, wherein the network packets include Internet
2 Protocol packets.

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1 21. A method comprising:
2 receiving a first Time Division Multiplexing (TDM) signal that includes
3 overhead data and payload data;
4 determining frame boundaries within the first TDM signal;
5 placing the first TDM signal into first packet engine packets based on the
6 frame boundaries within the first TDM signal;
7 receiving a second TDM signal;
8 placing the second TDM signal into second packet engine packets,
9 independent of frame boundaries within the second TDM signal; and
10 generating network packets from the first and second packet engine packets
11 using a same packet processor.

1 22. The method of claim 21, wherein determining the frame boundaries with the
2 first TDM signal includes generating frame alignment data for the first TDM signal.

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1 23. The method of claim 22, wherein placing the first TDM signal into first packet
2 engine packets includes placing the overhead data, the frame alignment data and the
3 payload data into the first packet engine packets.

1 24. The method of claim 21, wherein the first and second TDM signals include a
2 Digital Signal (DS) – 3 signal.

1 25. The method of claim 21, wherein the first and second TDM signals include a
2 Digital Signal (DS) – 1 signal.

1 26. The method of claim 21, wherein the TDM signal includes an E3 signal.

1 27. A machine-readable medium that provides instructions, which when executed
2 by a machine, cause said machine to perform operations comprising:

3 receiving a TDM signal that includes overhead data and payload data;

4 generating frame alignment data based on locations of frame boundaries
5 within the TDM signal;

6 placing the TDM signal into packet engine packets based on the frame
7 boundaries within the TDM signal, wherein the overhead data, the payload data and
8 the frame alignment data into packet engine packets, such that packet engine packet
9 corresponds to a frame within the TDM signal; and

10 encapsulating the packet engine packets into network packets.

1 28. The machine-readable medium of claim 27, wherein the TDM signal includes
2 a Digital Signal (DS) – 1 superframe signal, such that each packet engine packet
3 includes a DS1 frame of the DS1 superframe signal.

1 29. The machine-readable medium of claim 27, wherein the TDM signal includes
2 a Digital Signal (DS) – 1 extended superframe signal, such that each packet engine
3 packet includes a DS1 frame of the DS1 extended superframe signal.

1 30. The machine-readable medium of claim 27, wherein the TDM signal includes
2 a Digital Signal (DS) – 3 signal, such that each packet engine packet includes a
3 subframe of the DS3 signal.

1 31. The machine-readable medium of claim 27, wherein the TDM signal includes
2 an E1 signal.

1 32. The machine-readable medium of claim 27, wherein the network packets
2 include Internet Protocol packets.

1 33. A machine-readable medium that provides instructions, which when executed
2 by a machine, cause said machine to perform operations comprising:

3 receiving a first Time Division Multiplexing (TDM) signal that includes
4 overhead data and payload data;

5 determining frame boundaries within the first TDM signal;

6 placing the first TDM signal into first packet engine packets based on the
7 frame boundaries within the first TDM signal;

8 receiving a second TDM signal;

9 placing the second TDM signal into second packet engine packets,

10 independent of frame boundaries within the second TDM signal; and

11 generating network packets from the first and second packet engine packets
12 using a same packet processor.

1 34. The machine-readable medium of claim 33, wherein determining the frame
2 boundaries with the first TDM signal includes generating frame alignment data for the
3 first TDM signal.

1 35. The machine-readable medium of claim 34, wherein placing the first TDM
2 signal into first packet engine packets includes placing the overhead data, the frame
3 alignment data and the payload data into the first packet engine packets.

1 36. The machine-readable medium of claim 33, wherein the first and second TDM
2 signals include a Digital Signal (DS) – 3 signal.

1 37. The machine-readable medium of claim 33, wherein the first and second TDM
2 signals include a Digital Signal (DS) – 1 signal.

1 38. The machine-readable medium of claim 33, wherein the TDM signal includes
2 a J1 signal.

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